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(1839-1914)

A PHILOSOPHY OF TIME
DEBUNKING METAPHYSICS AS ONTOLOGY

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CONTENTS

What is Metaphysics?
Philosophy, and the Logics of Time
Cosmology, and the Physics of Worlds
Theology, and the Ethics of Creation
Time ≡ Creation ≡ Grace

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SUMMARY

The viability of a new *metaphysics* of time and change presupposes a redefinition of the original idea of metaphysics which can no longer be understood as ontology, but which should rather be interpreted as *chrono-logics*, or *cosmo-logics.*

According to the traditional metaphysics, all truth is either timeless or eternal. This stance is here challenged by proving it possible to consider present contingent truth as being ephemerical, bound to emerge and perish together with the reality it depicts, past contingents being determined for all future, and future contingents being hitherto undetermined, thus unknowable. So *time* becomes synonymous with *creation.*

Contingency implies world-wide simultaneity, in spite of special relativity, but in agreement with the standard principle of cosmic isotropy which can be interpreted as a principle of the general equivalence of observers, i.e., as a generalized relativity principle. This is also a principle of obvious importance to ethics, if decoded by analogy. An ethics of creation, allowing for evolution, may be based on trial and error which is pointless without restitution, or resurgence, ultimately based on forbearance, i.e., *grace*.

A. INTRODUCTION: WHAT IS METAPHYSICS?

Since a librarian of ancient Alexandria bound the famous phrase *tà metá tà fysiká* up with the *próte filosofía* of Aristotle, metaphysics has been interpreted as the doctrine of being as being, *tó ón hé ón*, for centuries hailed as the most fundamental of sciences. According to Aristotle, *reality is thing-like*, all reality being of the nature of things.

The universe consists of nothing but things, and the highest thing is called *théos*. God is a being, or thing, and in this sense God is on a par with other beings, or things. The final step of Aristotle, to identify God with the very being of all particular beings, hence with Universal Being, or the Universe itself, was then a small one, indeed.

Quite another kind of metaphysics was developed by Plato, Aristotle's teacher. In contradistinction to Aristotle, Plato did not compose treatises: he preferred dialogues, and the whole gist of his thinking is dialectical which is the opposite of being dogmatical. According to Plato, knowledge is related to being in the same way as opinion is related to becoming - but higher than being is goodness, the ultimate source of being.

Plato therefore invented a philosophical monotheism in order to explain the origin of the *panthéon* of gods together with the creation of time and change and thereby the whole world of becoming and deceasing. Goodness, embodied in the Divine Craftsman, was the Paradigm needed to make *Kósmos* emerge from *Cháos*.

Chrónos, first of motions, arose together with *Kósmos* and was made measurable by means of the heavenly circuits of "sameness" (*aequator*) and "otherness" (*eklíptika*). *Kósmos* thereby emerged as *a perfect synthesis of structure and process*, which were the basic ideas of the contrary philosophies of Parmenides and Herakleitos.

A very modern philosopher, Heidegger, has written extensively about metaphysics. The ambitious project of his thinking was to combat traditional metaphysics by reverting to Parmenides and rethink his ancient vision aiming at uncovering the truth of being. According to Heidegger, logic has blinded metaphysics and has made it forget truth by focussing on the many being things instead of concentrating on Being Itself.

Therefore he conceived a subtle plan, viz., to break the rule of logic in science by confronting it to Nothing. Face to face with great Nothing, true Being reveals itself as a Presence embracing past and future. The task of philosophy is to rethink Being as Unity, avoiding the vulgar image of time as a linear succession of instants.

To a logically minded person, most of this must sound like sheer obscurantism. As I do not share the enthusiasm for "Fundamental Ontology" displayed by the disciples of yon master of linguistic opacity, I prefer to clear the table by forsaking his discipline in favour of a concern for the basic human experience of time and change.

So I will commit myself to develop a logic of time and change, indeed of creation, which may serve as the *organon* for a new metaphysics very different from ontology. This philosophy will take inspiration from Plato, Leibniz and Kierkegaard, all of whom were able dialecticians, eager to unveil nonsense disguised as wisdom.

Mogens True Wegener

1. PHILOSOPHY, AND THE LOGICS OF TIME.

By tradition, philosophy is the incessant search for *wisdom* whereas science is the relentless quest for *truth*. Is philosophy a science, then, the queen of science, or is it more like the root of the tree of sciences, whereof physics is the trunk? [1]

Truth is the whole,[2] Hegel said, and philosophy is the universal science of truth. But is it true that truth is the sole aim of wisdom? What of beauty, or mercy?

According to Aquinas, being is the same as being one, being true, being good, and being beautiful; all these predicates unfold the various senses of what it is to be. Such metaphysics may appear to many as being itself both beautiful, good, and true. However, if we are not bent to accept ontology, the doctrine of being, as our philosophy, we shall disagree - and there are plenty of reasons for doing so.

Ontology, whether it is assumed to reveal ultimate reality or the truth of being, must be expressible by propositions, which are assertions with truth-value: true or false. Only propositions, defined as descriptive sentences with subject, predicate, and copula, can have truth-value. But it is a meager truth that can be confined to a single proposition, and language is infinitely richer than the realm of propositions.

To establish our concept of language upon that of purely descriptive sentences, defining meaning in terms of truth-conditions, is unwise: truth is dependent on meaning, not the other way round. It is rash to define philosophy as the universal science of truth, unless one is willing to accept that there are different senses of truth.

The point is that the truth of a proposition, universal or particular, differs from the truth of a set of propositions, which again differs from the truth of an entire philosophy. Similarly, truth *in* a logical system differs from the truth *of* a logical system.

The notion of truth is basic to logic which is the instrument of human reason. Provisionally, we may define logic as a formal discipline that sums up the rules for the valid transport of truth-value, true or false, from the given premisses to their conclusion.

If some unique system of logic could be claimed to be the only valid system, our problems might be less. But even on the basic level there are competitors to the standard logic: the intuitionist logic of Brouwer, and the 3-valued system of Lukasiewicz; and as regards tempo-modal logics not open for a translation into truth-value semantics, such intensional systems turn out to form a tree-like hierarchy.

All logic systems have two aspects, viz., a syntactical one and a semantical one. From the point of view of *syntactics*, a full-fledged logical system consists of rules for well-formed formulae, as well as definitions, assumptions, and principles of inference. Assumptions are also called *axioms*. Some formulae are valid by virtue of their form, no matter how they are read. Such formulae, provable in the system, are called *theorems*. Jointly, axioms and theorems are called *theses* of the system. The question of formulae not valid due their form is an empirical one, and must be decided by their interpretation. In general, the question of the truth of propositions is semantic, not syntactic.

From the point of view of *semantics*, the logical system is described in a language which, by its internal structure, models certain very general features of the real world. Due to their generality, these features are compatible with a variety of concrete facts, each maximal set constituting a possible world. Now *possible worlds*, which I take to be nothing but *models*, free constructions of our intellect, can differ not only as regards contents, but also with respect to their *structure*, and this will be the case if the models concerned relate to different logical systems. If we stick to some basic system, its models will differ with regard to their contents, not their structure, and the validity of its theses will then be expressible solely in terms of truth-tables. If we consider higher systems, notably intensional ones, truth-tables do not suffice.

Before proceeding any further in this direction, it deserves mentioning that there is a tight connection between the syntactical and semantical aspects of a logical system. The crucial condition for claiming a particular system to be sound and complete is that a one-to-one correspondence can be shown to hold between its syntax and its semantics: the system is *sound* iff (i.e.: if, and only if) all its valid formulae, or theses, are provably true no matter how they are read; and the system is *complete* iff (i.e.: if, and only if) all provably true formulae can be shown to be theses in the system. In a sound and complete system of logic the theses are nothing but tautologies.

Now it is customary to distinguish tautological propositions from empirical ones. The traditional view is that *tautological* propositions are true solely in virtue of their *form* whereas *empirical* propositions, when true, are true in virtue of their material *contents*. In what follows I shall identity a fact with a true proposition that is not provably true in virtue of its form. True propositions presumably tell us something about *reality*.

However, I shall insist that the tautological propositions of a logical system can tell us much more about the *structure* of reality than empirical propositions can ever do. The point is that the semantical model serves as an intermediate between thought and reality which provides us with *a tertium comparationis* enabling us to compare a system of *logics* with a theory of *physics*. We shall later find occasion to compare some different interpretations of quantum mechanics with various systems of tempo-modal logic which are translatable into models of branching future possibilities.

It is a commonplace between philosophers to distinguish *the humanities* which, being primarily historical and idiographic, attempt to *describe* and *interpret* the individual traces or remains of a factual past, from *the social and natural sciences* which, being mainly theoretical and nomothetic, aspire to *explain* and *predict* the general trends of an unknown and, maybe, entirely fictitious future.

Without discussing the adequacy of these characteristics, it seems safe to say that *history investigates the past* whereas *theory prepares us for the future*. So it is natural to conclude that *the distinction of past from future constitutes a transcendental condition which is fundamental to all branches of human knowledge*. Indeed, the very possibility of experimental science seems to be crucially dependent on this transcendental condition: without that we cannot even distinguish experience from prediction.

Let us now take a closer look at the possible worlds semantics of formal logics. It is pretty obvious that ***experience*** involves a factual knowledge of the past whereas ***prediction*** implies that the notions of possibility and necessity be applied to the future. The cognisance of this invites us to investigate the systems of tempo-modal logic.

In tense logic, that originated with A.N. Prior, it is commonplace to distinguish between *dated* propositions which are determinate and *undated* propositions which are indeterminate. The firm stance of Prior is that the latter remain full-fledged propositions, although their truth-value may change with the passage of time.

In the philosophy of *Leibniz*, who did not fully realize the importance of temporal distinctions, *a possible world* is defined as a maximal consistent set of propositions that describes a linear succession of events. A world is *a total succession of individual states*. Contrary to later views, Leibniz saw possible worlds as virtually real, and - such worlds constituting *B-series*, not *A-series* - their time does not flow.[3]

Now, in order to explain the apparent flow of time and the seeming emergence of possibilities pointing towards the future, he not only depicted worlds as linear orderings of successive world-states; he also imagined the totality of possible worlds in the picture of an infinite bundle of world-lines converging towards the past, but diverging towards the future. His final picture is that of a parallel bundle of world-courses diverging at every instant in the direction of the future, the present ("now") being identified as the instant when the bundle diverge towards different branches of possible futures.

This explanation, however, leaves the *now*, or present, without any clear indication. The very same objection can be raised against the system of *Ockham* which may be viewed as a forerunner to that of Leibniz. The main difference between these two systems of logic is that the past in the system of Leibniz is depicted as a bundle of fibres, whereas the past in the system of Ockham can be likened to a massive trunk.

For this reason, the entire set of possible world-courses (relative to a given 'now') in the Ockham-system can be seen as a set of different futures coupled to the same past, whereas a comparable set of different futures in the Leibniz-system merely feigns to be connected with the same past. The diffence can be summarized in the following manner: an Ockham-world splits up any second, a Leibniz-world never bifurcates.[4]

The systems are nevertheless on a par as regards the status of truth-value which is given of eternity to any proposition if it refers to some future instant of a given world; this holds even if instants are interpreted as *instant-propositions* in the manner of Prior.[5] A proposition dated relative to a given world course obeys the basic principles of identity, of the excluded middle, and of non-contradiction, or consistency, without exception.

Another way of expressing this fact is to say that the operator representing dated future is transparent to negation, meaning that an outside and an inside negation together produce an affirmation. The two systems are likewise on a par in the sense that they both allow us to distinguish a *factual future* from a merely *possible future* as well as from a strictly *inevitable future*. As pointed out by Øhrstrøm & Hasle,[6] this fact is interesting, since it makes them accomodate closely to ordinary linguistic usage.

Two other systems of tempo-modal logic are interesting for the reason that they, by contrast, do not allow us to identify a factual future as being distinct from a possible future and a necessary future. These systems, named after *C.S. Peirce* and *S. Kripke*, differ from the two just mentioned by making a difference between outside and inside negation of the operator for dated future, thus making it opaque to double negation.

In *the Kripke-system*, the future is not determined, so it softens the principle of non-contradiction by *accepting all future contingents including their inner negations*.[7]

In *the Peirce-system*, the future is determined, so it slackens the principle of the excluded middle by *rejecting all future contingents including their inner negations*.[8]

Both systems are similar to that of Ockham, depicting the past as backwards linear, but, in the Kripke system, time is branching into different futures which are all factual, and, in the Peirce system, only possible futures branch, such possibles being imaginary.

I will now briefly consider the logic of the Danish philosopher *Kierkegaard*.

In his *Philosophical Fragments*, and in the *Concept of Dread*, we find ideas which can be combined in a way at least resembling a plausible system of tempo-modal logic. In one place, he identifies the future with the possible and the possible with the future, in another, he claims that time is linear. When combined, this implies determinism.[9]

Kierkegaard was not a determinist, but a determined defender of human freedom. So let us assume that, when comparing the possible with the future, he was talking of the indeterminate, or undated, future. Let us further suppose that, when saying time is linear, he was talking of determinate time, viewed as a succession of abstract instants, or dates. Future possibles are branching. The calendar, as an ordering of dates, is linear.

Kierkegaard insisted that *possibility is temporal* whereas *necessity is atemporal*. This debars the common definition of 'necessary' as 'not-possible-not' or, alternatively, of 'possible' as 'not-necessarily-not'. Taking possibility and necessity as our primitives, this suggests that we define the inevitable as that which is not possibly not the case and that we define the conceivable as that which is not necessarily not the case.

Instead of having only one pair of contraries, we thus end up by having two pairs: 1) a *temporal* one: possible *vs* inevitable; 2) an *atemporal* one: necessary *vs* conceivable. As a consequence, this will provide an eventual logic with much greater expressive force. I will now sketch a logic which is akin to Kierkegaard's in certain respects.[10]

We start by adopting the *branching structure* of the systems of Peirce and Kripke which combines *the linearity of the factual past* with *the branching of future possibles*. What I mean by *possible* is what is *now still preventable*, i.e., *not now inevitably false*, just as what I mean by *necessary* is what *cannot be denied on pain of contradiction*, i.e., what is *not conceivably false*. What modalities we take as primitives is arbitrary.

We next introduce *instants* by means of *clock-propositions*, that are propositions *true only once*, but *neither earlier nor later*, and *covering all the branching possibilities*. Using this means, we construe a *calendar* as *a completely ordered set of world-instants*, each individual instant being indexed with reference to a particular possible world-course. A possible world-course is definable as a maximal consistent set of propositions.

Following Peirce, we have defined the true future as that which is now inevitable, i.e., determinate, and defined the possible future as that which might still be prevented, i.e., as that which is now indeterminate. Thus true future means dated future, and dates must, properly understood, involve a total ordering of all temporal events.

Hence, what is necessary was always inevitable, what is future is now inevitable. However, this very future may have been preventable, or been unstatable, a moment ago. This lends a kind of inevitability to the future without making it strictly necessary.

Such logic, I contend, yields a promising base for our new metaphysics.

2. COSMOLOGY, AND THE PHYSICS OF WORLDS.

Passing on to cosmology we must ask: What sort of entity is the present world? Referring to the only real world, not one of those imaginary constructs we call possible, it is unique. Plato, in his late dialogue *Timaios*, declared: [11]

Thus, in order that this cosmos might be eminently like (its paradigm which is) the most perfect of living beings, the Divine Craftsman produced neither two worlds, nor an infinity, but our world is the only one to have been created, and will ever be.

Having been asked how he could be so sure of that, his answer might have been: this is what we mean by 'the world', therefore it is simply a matter of correct definition. Hence, the world is the totality of that which can be said to exist now.

This unique totality is outside the scope of anyone's experience except that of God. We conclude that the term *'universe'* denotes *a limiting concept* in the sense of Kant: it seems intelligible and, like an angel in scholastic theology, it is the only one of its kind. The idea of the universe as the sum of all now existing things, a totality that, transcending experience and intelligence, is unobservable and unknowable, is indispensable if we are to make sense of the contents of our human experience - but it is also paradoxical.

The material contents of all possible worlds are temporal occurrances, or events. A universe in which nothing happens makes no sense, such a world cannot be called real. We shall here take the further step to identify a world with its temporal world-course: the real world is nothing but the actual world-course of events which are observable to us together with those events which must be presupposed as their necessary conditions.

What we perceive is a swarm of sense-impressions: they impinge upon our senses. By perceiving them, we are aware of events, past and present, and imagine future ones. Hence, *I shall insist that **Time**, as discerned by its modes of **past**, **present**, and **future**, is a necessary concomitant of all possible worlds, including the actual one.*

This, in fact, brings us very close to the view of André Mercier who has proposed to identify the universe with a relativistic *super-time* of one plus three dimensions.[12] I sympathize with Mercier's metaphysics which claims that *temporal flux* is real in the sense of being the bearer of factuality or existence. Its central idea is very original: it states that *being, or reality, is what is given to us as time flows* from future to past. But I am convinced that, to vindicate this idea, a final step must be taken.

This step will no doubt seem radical to all who, like Mercier, have been inspired by Einstein's two theories of relativity, since it implies a revival of absolute simultaneity! Furthermore, the idea of a flowing time is intimately connected to modern tense logic, and such logic does not make sense unless temporal modes are conceived to be absolute. A sharp cut must be made between *facts*, past or present, and *fictions* of the future.

Likewise, our notion of existence, signifying the endurance in time of something which did once emerge and may once expire, is bound up with the concept of interval. However, *special relativity*, by discarding absolute simultaneity, did also relativize the notion of interval: given that the existence of a thing - a lump of radioactive matter, say - is limited to a definite temporal interval, it may happen for three observers in fast relative motion that, by their meeting, the first reports that the lump was no longer radioactive, the second that it is still there, and the third that he did not see any lump in that place.

The above paradox may be considerer to be a universal conundrum of existence. According to the special theory of relativity, *the concept of existence is individual and relative to the reference frame of a particular observer*. In temporal logic, this idea just does not work.[13] The relativisation of simultaneity is the most fatal blow ever given to scientific realism. The only question is: when, and how, will reality hit back?[14] (NB!)

To an observer, a thing always emerges as a series of causally connected events; this is a clue that the concept of a thing can be constructed from the notion of an event. The important point is that, howsoever we conceive of existence, whether we define it or use it as as a primitive: *a concept of existence that is not transitive makes no sense at all, since an intransitive concept is particular, or private, which is next to illusion*.(13)

Further, it is of no avail to postulate the existence of four, five, ten or even three hundred and sixty dimensions of spacetime, since this will change the sense of that word. If to exist means to appear in spacetime, then spacetime itself does not, cannot exist; but if spacetime does exist, then everything in it has "timeless being", whatever that is.

Some philosophers have gone so far astray as to defend physics by proposing a metaphysics that reduces events to be nothing but the timeless properties of coordinates. According to this view, absolute super-space is the sole reality, all details being merely the modes of a super-being which would have gratified Parmenides as well as Spinoza. Both Strawson[15] and Quine[16] seem to be potential proponents of such a world-picture, which would constitute the final implementation of the scientific program of Einstein, namely, to reduce everything in natural science to space-like concepts.

What is *empirical* in physical geometry is of a *topological*, not a metrical, nature. On this crucial issue, *I prefer to side with Poincaré rather than with Einstein: coordinates are conventions, just like the metrics incorporating them, and should not be hypostatised to abstract properties characterising natural things in any absolute way.*

Neither is it rational to concoct a temporal metaphysics based on those absolute entities called instants, or dates, whether they be of universal or of merely local validity. Dates, ordered in linear series, are calendars, but calendars do not inhere in the universe. This does not prevent us from devising calendars based on scientific reasons.[17]

But philosophy should not be reduced to the goal of interpreting natural science. Philosophy is not the handmaid of theology, but neither is it the handmaid of physics. Hence, it should not degrade itself by accepting the modest job of "mopping-up work" (Locke), its true aim being to unify profound analysis with inspired synthesis.

However, philosophizing is not solely the prerogative of academic philosophers. Scientists also have their freedom to think, and Eddington, astronomer and cosmologist, in a philosophical vein, once pointed out that *the physical world* is, in fact, very different from *the world of the physicist* or, as we should rather say, for indeed, there are many: the worlds of the physicists. What he meant was probably that the physical world, i.e., the real world, our actual physical universe, is one of a kind, or unique.

Since the only kind of similarity our intellect can grasp is similarity of *structure*, the only way for us to come to know anything about the real world is to devise *models*, the structure of which can then be compared to that of the real world. The world as a *thing in itself*, independent of observation, is unfathomable. What is left to know is the world as a *thing for us*, but this world is many. How do we come to know the real world? By devising models of the world and testing them by observation and experiment.[18]

Cosmology has not yet succeeded in producing a viable "grand unified theory", although attempts in that direction have been made. Until now we possess only partial theories, fragments of models. The unification of general relativity theory with quantum mechanics is still in jeopardy due to an irritating emergence of infinities, and the standard renormalisation procedure made use of for their removal is clearly *ad hoc*.

As pointed out already by Heisenberg, the great obstacle is the relativistic denial of classical absolute simultaneity.[19] More recently, John Bell has even admitted that the cheapest solution to the problems confronting physics after the experiment of Aspect might be to go back to relativity as it was before Einstein, when people like Lorentz and Poincaré thought that there is a preferred frame of reference, an aether.[20]

For my own, I would prefer a solution which would make a new radical kind of relativity theory compatible with a refined form of absolute, or invariant, simultaneity. However, the prevailing tendency at the biennial conferences on relativity, which I have attended in later years, shows a preference for some kind of substratum theory.(18)

Such a theory might indeed solve the problem by invoking a preferred reference frame as defined by the socalled 3K cosmic microwave background radiation (CMBR), in accordance with Weyl's principle. This reference frame, of course, would no longer be stationary, but dissipating. It is therefore natural to assume that it would possess dynamic properties that would enable us to explain gravity in terms of spontaneous accelerations, due to local deviations from the overarching symmetry, which is: cosmic isotropy.[21]

Such explanations have been suggested by Milne, and much later by Landsberg, who both invented cosmologies in conformity with the Hubble law of cosmic expansion. The theories are characterised by their consent to a principle implying certain minimal requirements as regards isotropy and homogeneity, known as the cosmological principle. Although the principle is often ascribed to Einstein, it is due to Milne.[22]

It was first shown by Robertson, and independently by Walker, with inspiration from Milne, that any world-model in which the average distribution of matter-in-motion conforms to the cosmological principle is describable in terms of an expansion-factor where a statistically defined, universally invariant, time parameter serves as the argument. Thus a *Cosmic Time* is definable for all standard Robertson-Walker models! (14)

This fact, as I see it, is extremely important. If it is further possible to estimate the size of the fluctuations in the average density and distribution of matter in the world, we must be able to specify: deviations from what? From the universal mean, of course! Now atomic clock rates are retarded by dynamic forces, thus we must be able to specify: retardations relative to what? Relative to the Cosmic Time, of course!

So I shall follow Whitrow by claiming that the internal oscillations of atoms must ultimately be determined by a *cosmic rhythm* which is invariant with respect to an ideal class of equivalent fundamental observers conforming to the principle of cosmic isotropy. However, I shall insist, against Whitrow, that this rhythm is not merely a statistical one, as it reveals the conformity of physical phenomena to ideas of reason (cf. Kant).

This metaphysical conjecture furthermore opens the possibility of revolutionizing our understanding of the phenomenon of gravitation so that, instead of explaining the retardation of clocks by the influence of gravitation, we might instead attempt to explain gravitation in terms of the retardation of atomic clock-rates! [23] (NB!)

So there is no reason at all to discard the classical notion of absolute simultaneity. On the contrary there is every reason to retain it in order to vindicate a new tempo-modal logic which lends formal support to the age-old idea of a never ceasing temporal flow: a flow which, according to Mercier, is passing from the future towards the past.

But instead of elaborating on this new metaphysics of time and change at present, I will briefly hint at the structural similarities between various semantical models of tense logic and certain interpretations of classical and quantum mechanics.[24]

First, it seems that the Leibnizian idea of the world as a linear series of world-states, the past being the cause of the future and the future preserving the past, in a way resembles the determinism of Laplace. Granted the description of a single world-state, all other world-states, past or future, are then computable to the tiniest detail.

Second, it appears that the Ockhamist idea of possible worlds as a tree, linear towards the past, but branching towards the future, with a privileged world depicted as "a thin red line", discerned by marks hidden to all observers, resembles the image given by Bohm of the classical world as causally imbedded in the sub-quantum world.

Third, the many-worlds interpretation of quantum mechanics by Everett and de Witt appears to resemble the possible world semantics of Kripke, having no privileged sequence of world-states, but only a brushwood of branches budding from bifurcations, thus framing a diffused infinity of virtually real futures.

To these three systems of logic which are more or less deterministic I shall oppose a new system of tempo-modal logic which is indeterministic in the unique sense that it lets all causal determination depend on *creation*, conceived as *time-flow*.

This does not imply that causality is absent, or impotent, but it simply means that it is contingent, that it is dependent on the steady flow of time, from the future to the past. This is further correlated to the fact that all human experience originates from becoming. It finally frees us from fiddling with quantum logics and non-Boolean algebras.

The system is sketched by myself in a joint paper with my friend Peter Øhrstrøm.[25] This logic, devised for a time-bound truth emerging together with the reality it depicts, is uniquely well suited to disclose the formal structure of the concept of contingency, so crucial to an appreciation of the Christian idea of *creatio ex nihilo*.

3. THEOLOGY, AND THE ETHICS OF CREATION.

The antique philosophy is characterized by the transition from *mythos* to *lógos*, and it has since been a matter of major concern to many thinkers, ancient and modern (except, maybe, the greater ones) to deliberate philosophy from "the gods".

On the contrary, the unity of *lógos* and *mythos* is central to Christian doctrine. The majestic *prologue* of the gospel according to St. John (*KATA IΩANNHN*) begins by proclaiming the myth of the Divine Lógos: *'Εν ἀρχῆ ἦν ὁ λόγος ...*

"In the beginning was the Word, the Word was with God, and God was the Word. The same was in the beginning with God. All things were made by him, and without him [became not one which has become]. In him was life, and the life was the light of men. And the light shineth in the darkness; but the darkness did not understand it ... And the Word was made flesh, and dwelt among us (and we beheld his glory, the glory as of an only-begotten Son of a Father), full of grace and truth."[26]

In *Concise Oxford English Dictionary (COED)*, 1934, we find a myth is described thus: "A purely fictitious narrative usually involving supernatural persons, *etcetera*, and embodying popular ideas on natural phenomena." The tenor is definitely positivistic: *fictitious* contrasts with *factual* in the same way as *popular* and *supernatural* contrast with *scientific* and *natural*. The *COED* is a token of educated opinion.

As our point of departure we therefore have to face the fact that the central idea of Christianity - which is that Christ, God's Anointed, became incarnate in the man Jesus of Nazareth, who was recognised in the Gospel as the only-begotten Son of the Father - according to a general academic consensus peculiar to the era of modernity is nothing but (oh, all that "nothing-buttery" of our "enlightened" age!) the fantastic core of a fairy tale traded down to us by past generations of illiterate people.

If we now turn to the most influential Christian thinker of our own modern age, Søren Kierkegaard, there is no help to be found, and we shall therefore be no better off. According to Kierkegaard, the Incarnation, interpreted as the unification of God and man, an unique temporal manifestation of eternity, constitutes an Absolute Paradox, and a true absurdity to non-believers, unfathomable to anything but revelation. In the same vein, according to Kierkegaard, proofs of the existence of God are ridiculous, for if He exists, they are superfluous, and if He does not exist, they must be inconsistent.[27]

However, as I have argued earlier, such way of reasoning is simply superficial. If God has created the Universe, which is the totality of everything that can be said to exist, it makes no sense to ask whether the Creator himself exists, the only significant question being if Christ, God's Anointed, did once exist, namely, as a human being.

Further, as conceded by Kierkegaard, proofs of God may after all be reasonable, and even useful to people, if they were expressly designed to elucidate the Idea of God. But this, precisely, was the motive behind the dialectical proof proposed by St. Anselm. As I have demonstrated earlier, the proof is valid when reconstructed in terms of modern symbolic logic, its premisses being implicitly granted by the atheist.[28]

So the claim of the atheist, that there is no God, can be silenced by formal logic: either the atheist does not understand what he is talking about when claiming that God, alias *quod-nihil-maius-cogitari-potest*, is an illusion, or he is just contradicting himself. Both horns of the dilemma severely threaten his intellectual integrity.

If, by *mythology*, we do not understand merely a narrative body of myths, but also the formal study of myths, it is of great importance that their sensitive interpretation is not hampered by setting up artificial barriers between illusion and reality, fiction and fact. To the fulfilment of this goal St Anselm's proof, by defending the Christian Idea of God against the attack of "enlightened" atheism, represents a major step forward.

The next step in paving the way for an appreciation of the Christian *Lógos-Myth* would be to repudiate the insinuation that the Christian Idea of God, when it is interpreted as a unitary idea, is beset with contradictions, or flatly incoherent.

This claim, as founded upon the apparent conflict between *Divine Providence* and *Human Freedom*,[29] was already countered by some able logicians in the Middle Ages.[30] Nevertheless, the medieval solution, although consistent, does not seem very plausible, and so another solution is needed in order to overcome the lingering doubts.

However, I have since long felt a growing suspicion that the idea of timeless truth is an import of Greek origin, foreign to the Christian tradition, and that the idea of God's providence as implying a knowledge of future contingents is an unfortunate construct. Maybe the word 'providence' simply means: God's active care to fulfil his vows!

With my attempt to re-interpret the central ideas of the Christian tradition in the light of the (Jewish-Christian) Bible, I have borrowed my inspiration from J.L. Lucas.[31] His point of view is supported by a remark due to the Danish national bard, Grundtvig: "the creation is a divine experiment". A natural interpretation of this passage is that even God does not know the outcome of his own experiment in advance because, if he did, it would not be a genuine experiment! What the Gospel certifies is that God is on our side in our struggle against evil, and that God has promised us the final victory.

One might ask: What if everything is planned, all truth being known of eternity? This, of course, is the engrained view of Christian tradition. Why should it be mistaken? Because, if God knew everything in advance, his very act of creation would be pointless! What reason could convince God that it was good to duplicate his original vision?

More important is the fact that the idea of God acting in time and caring for his beloved creature, is much closer to the Bible than the usual idea of an eternal, immutable, and dispassionate deity transcending time as well as the sufferings of man.

If the creation of the universe, together with the life it contains, is in fact a divine experiment, then not only its outcome, but even the laws determining that outcome, may be unknown as yet. Maybe the laws of nature are habits, as proposed by Peirce?

Perhaps the laws of nature are not given of eternity, but originates from evolution? If that were true, if laws are customs, then *lex* would be akin to *mos* and *nómos* to *éthos*, and the difference between the laws of nature and the laws of society, or those of morals, would be a matter of degree rather than a matter of kind. Nevertheless, it can be argued that evolution must happen in agreement with certain trancendental conditions, respecting the division of time in past, present, and future, if a universe is to emerge at all.[32]

Formal models of the universe are constructed by scientists who have a double rôle in the great play of human life, being at the same time both participants and observers. A condition of objective knowledge is that scientists are able to communicate in order to ensure that they use the same definitions for their exchange of data. To this purpose they have to agree on using transformation formulae that are invariant to the communication of observational and experimental data between various observers.

We may therefore conclude that a primary condition for a rational universe is that it allows the definition of a universal class of fundamental observers which are equivalent in the sense of possessing congruent clocks. The *cosmological principle*, generalising the relativity principle by claiming *the existence of a universal class of equivalent observers, is necessary if the universe is to be transparent to human science at all*.

This fact is of great significance, not only to the exact sciences, but even to morals. My point is that the cosmological principle can be read as both descriptive and normative: *In the absence of evidence to the contrary, treat all observers as if they were equivalent!* Although the fundamental status of observers may thus be regarded as a matter of degree, it is of the utmost importance that the principle provides us with a cosmic norm or ideal. *The principle thus becomes comparable to the principle of universality in morals.*

When it comes to the laws of a higher order in nature, such as those of biology, it seems clear that these are the outcome of incessant trial-and-error in energetic systems that are subject to the fundamental principles of thermodynamics. Many serious attempts have been made to deduce the laws of thermodynamics from those of classical physics, but in vain, one of the latest being due to Ilya Prigogine.

In fact, the main conclusion of Prigogine is right: considerations of entropy alone are not sufficient to distinguish between the positive and the negative directions of time; thus physics is in need of a principle of selection in order to know which is the right one. Fortunately, a proper tempo-modal logic can provide the principle!

One of the greatest attempts in history to frame a moral philosophy is that of Kant. His metaphysics of moral conduct is appealing and appalling at one and the same time: it is at once an object of admiration and an object of abomination.

The problem with his ethics is that it is impotent: it blocks motivation by showing duty as alien to human emotions. Kant's fault was to invent an artificial chasm separating law and duty from love and life. So his morality is foreign to humanity.

How must it be changed? First we must give up his view of causality and freedom. Instead of trying to excavate a loophole for freedom in the context of natural causality, we shall have to search for a natural place of causality within the context of freedom. Therefore we must start by constructing an indeterminist logic of time and then we must advance by investigating the implications of that logic to physics and biology.

This means we should, in fact, have taken precisely the course we have followed. So the way is now open for us to investigate the relation between science and morality. We shall here follow Kant by conceding that nothing but the will can be judged good. A good will, motivated by respect for the moral law, is the well-spring of human dignity. When a good will is good by itself, not by its end or purpose, its value is intrinsic.

However, the spontaneity of divine love, when moved entirely by itself, transcends duty which is the urge for action motivated by respect for divine law and human dignity. The dignity of man as an imperfect image of God derives from the fact that man is a rational animal subject to morality and empowered to act according to duty.

The frailty of this image is evidenced by the fact that man is selfish, unable to love his fellow by heart, without being driven to it by his fear of penalty. Some love is natural: that between man and wife, between parents and children, just as friendship is natural. The gospels testify that there is a love transcending nature: that of God.

Among the moral imperatives, some are hypothetical and others are categorical. Compliance to *a hypothetical imperative* is inspired by *desire* for what appears under the aspect of good. Obedience to *a categorical imperative*, on the contrary, is inspired by *respect* for what appears under the aspect of duty.

The source of categorical imperatives is the *principle of universality* which says: "Thou shalt act so that the rule of thy action can be generalised to a universal law of human conduct without impairing life or human dignity!" That this tacitly implies the principle of the *universal equivalence* of human agents is obvious, its meaning being: "Do unto thy neighbour as you wish he should do unto you!"

By acting according to this principle, the human will takes on a legislatory rôle. Choosing its own rule of action, it determines a law of social behaviour.

Natural causality alone furthers *heteronomy*. Spiritual striving furthers *autonomy*. Autonomy, the power of will when instructed by reason to create and obey its own laws out of esteem for life and human dignity, is the essence of freedom.

The idea of *freedom* is a latent logical potentiality in each single human individual. As heir to that idea, each human individual is a *person* and entitled to become member of a spiritual realm of moral purposes referring directly to God.

In order to become truly free, it does not suffice to act under the aspect of freedom: the great difficulty is to vindicate freedom in the practice of moral action.

Freedom of the will is not a human property, but the ultimate purpose of life. The possession of perfect freedom and innocent life is an exclusive divine prerogative. The principle of perfection converges towards the principle of happiness, or beatitude, The perfection of freedom in spontaneous love is the ultimate wellspring of joy.

The universe, which demonstrates the goodness of its Creator, is its own purpose. Spontaneous manifestations of life and human dignity are their own purpose.

Man as a moral agent is his own purpose, and his freedom should never be subdued by narrow bigotry, nor should it be used as a means to promote ignoble aims.

Ω. CONCLUSION: TIME ≡ CREATION ≡ GRACE.

By seeing consciousness, the complex of reason, will, and emotion, as the result of a universal urge towards the spontaneous emergence of laws, or habits, of ever higher order and complexity, we open up the possibility of infinite mental evolution.

Indeed, if the present stage of the development of consciousness on this globe were a summit that could never be surpassed, we would be truly wretched creatures! But the driving force of evolution is trial-and-error, combined with survival of the fittest, and this is not a fact of biology only, but probably also of psychology

A condition of the success of trial-and-error is that the errors are not lethal in the sense that the repetition of trials is blocked by a closure of time. Regarding phylogenetic evolution, it is a clear presupposition for development to take place that time is granted. But this is even clearer with respect to the unfolding of ontogenetic potential.

That the flowering of mental capacities is conditioned by trial-and-error in the course of education is a psychological fact too trivial to be in need of being emphasized. What then can be said of the survival of the fittest in the context of human psychology? In order to elucidate that question, we shall consider culture and art.

It is a commonplace that art represents the expressions of our creative abilities. What is not a commonplace, by contrast, is the conjecture that these expressions are the more sublime, the better they succeed in manifesting the universal in the particular and, similarly, that they are the more impressive and fascinating, the stronger and more comprehensive the laws embodied in the individual work of art concerned are.

This kind of strength is spiritual and ought not to be confused with brute force. My point is that the power of life depends on the scope of the laws it unfolds, and that its vitality is evidenced by its ability to invent and obey its own laws.

In order to substantiate this point of view, we shall have to turn to human history. It is a well-known fact that the supreme fruits of culture: the great works of art, literature, music, and philosophy, have all survived due to their "fitness", meaning: their suitability to express comtemporary human feelings, aspirations, and hopes.

This also applies to Christianity if, ignoring its uniqueness, it is compared to other world-religions. The power of Christianity is similarly to be found in the laws embodied by its founder and brought to completion and perfection through him.

However, the Christian belief is a great paradox, indeed, the sovereign paradox. Therefore its strength is found in weakness, its pride and honour in humility, just as its power to overcome corruption is tightly bound up with the secret of suffering.

This may sound much like the Baconian motto: *to conquer nature by obeying her*, except that to set up power, vitality, and conquest, as aims in themselves would be to replace morality with egotism, repeating the error of Nietzsche.

Traditionally, Protestantism has always put great emphasis on the gift of grace. For this reason, it is strange to compare the Protestant origin of the Kantian ethics with its insistence on the necessity of God as a divine instance whose primary function it is to sanction morality by giving eternal penalty or reward to the will of man.

Kant did not recognize that, by assigning this purely moral function to God, he not only alienated man from his creator, he also scorned grace by taking it possible for man to deserve divine reward. Neither did he realize that external sanction, reward or penalty, is foreign to his own idea of the moral imperative as categorical, not hypothetical.

The crucial point to grasp is that to follow a good will up in act is a reward in itself, just as to follow a base will up in act is a penalty in itself. The truth of this is unveiled *sub luce aeternitatis*, as demonstrated by Dante in his *Commedia*.

Paradise, which is a symbol of the fulfilment of our deepest yearnings, is open only to the will that has found freedom by acting in accordance with the divine goodness. To this purpose, the perfection of our will by love, grace is indispensable.

What good we can do is solely from God, but our evil deeds are always our own. Without grace, the goodness of the will is just an empty posture.

According to a Protestant view, morality is only a vain substitute for spontaneity. However, the Lutheran word: *simul justus and peccator*,[35] is a contradiction in terms, and to wait for miracles to happen is to scorn the exhortation: "Wilt thou be made whole? Well then: rise, take up thy bed, and walk!"[36]

Contrary to this, the Thomist saying: *gratia naturam non tollit sed perfecit*,[37] assumes grace to be effective regarding the piecemeal improvement of human nature. Grace can never be deserved for, if it could, it would not be grace; but if only theologians would admit that *grace may work*, the immense potential of religious energy latent in our society could be set free to improve our dreadful world just a little bit.

The present condition of mankind is miserable, indeed. But, as Leibniz insisted: the actual world, being the one and only, may after all be the best of all possible worlds: not only is it ruled by the best laws, producing the richest and most complex effects from the simplest and most sparing means, but it also furthers, and better than any other world, a steady progress towards the realisation of our most lofty hopes.

What we need is not pessimism, but a new optimism, supported by a trustworthy metaphysics claiming that: ***Time is Creation, The True Gift of Grace***.

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Mogens True Wegener

NOTES:

1. Cf. Descartes on *mathesis universalis*: philosophy is compared with a tree of which the root is metaphysics, the trunk physics, and the branches all the other sciences.
2. *Die Wahrheit ist das Ganze!*
3. The distinction between the A-series: *past*, *present* and *future*, that is absolute, and the B-series: *earlier*, *simultaneous*, and *later*, that is relative, derives from the Scottish philosopher McTaggart who argued against becoming, insisting that the flow of time is nothing but an illusion.
4. For the Ockham-system as formalized by McArthur and the Leibniz-system as formalized by Nishimura, cf. Øhrstrøm & Hasle: *Temporal Logic* .., Kluwer 1995.
5. Cf. A.N. Prior: *Past, Present & Future*, 1967, *Papers on Time & Tense*, 1968, and his posthumous *Worlds, Times & Selves*,1977 (ed. Kit Fine).
6. Cf. Øhrstrøm & Hasle: *Temporal Logic* .., Kluwer 1995.
7. In the Kripke system, $F_n p$ is compatible with $F_n \neg p$ (different branches).
8. In the Peirce system, $\neg F_n p$ does not exclude $\neg F_n \neg p$ (indeterminate future).
9. Cf. Øhrstrøm & Hasle, ref.6 sect.1.2 on the master-argument of Diodoros Kronos.
10. Cf. my joint paper with Øhrstrøm: *A New Tempo-modal Logic for Emerging Truth*, in: J. Faye & al., eds.: *Perspectives on Time*, Kluwer 1996. - **NB**: for a new version, see ch.12!
11. *Timaios* 30A, compare also 32C.
12. Cf. A. Mercier in M. Wegener, ed. [1999]: *Time, Creation & World-Order*, Aarhus Univ.Pr.
13. Cf. the paper 'Some Free Thinking about Time' by A.N. Prior, reprinted in: M. Wegener, ed. [1999]: *Time, Creation & World-Order*, Aarhus Univ.Pr.
14. The relativity expert P.G. Bergmann already in 1970 spoke of "the breakdown of the principle of relativity" (*Foundations of Physics 1*) - and in his *The Natural Philosophy of Time*, Oxf.1980[2], G.J. Whitrow, co-founder of the *International Society for the Study of Time*, wrote: *The concept of the relativity of simultaneity on which, in 1905, Einstein based his Special Theory of Relativity, at first appeared to eliminate from physics any idea of an objective world-wide lapse of time according to which physical reality could be regarded as a linear succession of temporal states ... Nevertheless, a quarter of a century later, theoretical cosmologists who made use of the physical ideas and mathematical techniques associated with relativity theory were led to re-introduce the very concept which Einstein began by rejecting.*
15. Cf. P.E. Strawson: *Individuals*, Methuen 1959.
16. Cf. W.v.O. Quine: *Word & Object*, MIT 1960.
17. When Whitrow in his otherwise fine book: *What is Time*? London 1972, claims that, in an evolving universe, *there is a single universal scale of cosmic time in terms of which, depending on the choice made of time zero and unit of time, every event has, in principle, its own intrinsic date*, I disagree, insisting that dates are not 'intrinsic', they are something we construct!
18. Cf. my paper: 'Ideas of Cosmology. A Philosopher's Synthesis', *PIRT-Proc.*, BSPS, Ld. 1996, in: Duffy & Wegener, eds.: *Recent Advances in Relativity Theory Vol.1, selected papers from the PIRT Conf.s 1988-96, Vol.1,* Hadronic Pr., Inst.f. Basic Research, Florida 2000.
For a revised and improved version, see *Non-Standard Relativity* [2021[4]] BoD.

19. Cf. W. Heisenberg: *Physics and Philosophy*, reprint 2007.
20. Cf. J. Bell in: *The Ghost in the Atom*, Davies & Brown eds., Cambr. 1986.
21. Cf. my book: *Non-Standard Relativity* chs.1-3 & 9-10, BoD 2021[4] - and this book ch.15.
22. Cf. J.D. North: *The Measure of the Universe*, Oxf.1965.
23. Cf. A. Mercier, *'Gravitation **is** time'*, quoted from *Gen.Rel.Grav. 6*, 1975.
24. Cf. A. Rae: *Quantum Physics: Illusion or Reality*, Cambr. 1994.
25. See ref.10 as well as this book ch.12.
26. Cf. Nestle & Marshall: *Interlinear Greek-English New Testament*, 1960;
the bracket might be rendered: .. *became nothing of what has become* ..;
in the parenthesis I have retained the indefinite article.
27. Cf. S. Kierkegaard: *Philosophical Fragments* & *Concluding Unscientific Postscript*.
28. See the discussion this book ch.3.
29. See the discussion this book ch1.
30. Cf. the discussion in Øhrstrøm & Hasle: *Temporal Logic* .., Kluwer 1995.
31. Cf. J.L. Lucas: *A Treatise of Time & Space*, 1973, and: *The Future*, 1989.
32. Cf. ref.21.
33. "*At the same time righteous and sinner*".
34. The Gospel according to St. John, 5,6-8.
35. "*Grace does not suspend nature but makes it perfect*".

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